

Forest use in Finland: How a single resource affected the history and culture of a country

An Honors Thesis (HONR 499)

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Abstract

Finland, as a country, is one of the world leaders in the forest sector. Relative to its size, Finland is more dependent on the forest industry than any other country in the world. For this reason, forests have significantly influenced the development and culture of Finland. Because of this symbiosis, the people of Finland feel a sense of stewardship over this resource, which has always been deeply tied with Finland's culture. The purpose of this paper is to observe the use of forests as a resource throughout the history of Finland. Historically, the forests were used for slash-and-burn cultivation; a form of agriculture that allowed the Finnish people to settle the unfarmable land. This practice of cultivation fell out of popularity in the 19th century; however, during its time this method was the critical element in allowing the colonization of interior Finland. Today the forests of Finland are utilized in a multi-use forest system. Outside of industry and government uses, the forests are also used extensively by the Finnish people for recreation, relaxation, and communing with nature. This multi-use forest system is a model that many forested nations should aim to follow.

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Introduction

During the spring of 2015, while I was a junior at Ball State University, I spent five months studying abroad at the University of Eastern Finland in Joensuu, Finland. While I was travelling throughout Finland, there were a few things I immediately noticed. First was the large extent of the forests. I had a nine-hour bus trip from Helsinki to Joensuu where the whole time we were driving on small, snow-covered roads. We passed scattered towns but mostly we were driving through forests that got thicker and more abundant as I progressed more east and north. Once I arrived in Joensuu I noticed the extent of all the bike use. It was the middle of winter in one of the world's most northern countries, yet everyone was out on their bikes, every day. I was also aware of all the ski-tracks that ran through the town; if I wished I could ski to class every day. These characteristics of the town and people, as well as many others helped me paint a picture of Finland; the characteristics are all common because they display the connection the people have with their environment, specifically the forests. Through this characterization of Finland I will seek to explain how humans have used the forests as a resource throughout Finland's history and I will show how the people's historical connection to this resource has affected their views on the forests as a location of modern habitat conservation.

Finland is the most northerly mainland European country. It is over a thousand kilometers from north to south (Kirby 2006). It is relatively geographically isolated in comparison to many European countries; to the south and west lies the Baltic Sea, to the east the Russian taiga, and to the north the Arctic Sea. The summers are mild and brief with winters long, dark, and cold. In western Finland, snow cover is the lowest at 70 to 110 days a year compared to the north at 200 to 220 days a year. In northern Finland, snow and frost can happen even during the summer months (Kirby 2006). In central and eastern Finland, the average annual rainfall is 600-700 mm

with the annual temperature 5.5°C and a growing season of 100-180 days (Myllyntaus et al. 2002). The climate is cold; however, the warming effects of the Gulf Stream make the climate warmer than similar latitudes in Russia and Canada (Metla 2012).

Finland belongs to the hemi-boreal and boreal vegetation zone (Vuroisal & Laihonon 2000). This means that the land is chiefly dominated by the coniferous Boreal Forest. The forest cover is so extensive that the wilderness is never far from any human, especially in central, eastern, and northern Finland. Today 96% of Finland's forests are classified as semi-natural forests with the remaining 4% of forest classified as undisturbed forest. The forest cover in Finland is 76% of the total land area; this makes it the highest of any European country, followed by Sweden and Slovenia at 75% and 63% forest cover, respectively. Finland's forests alone represent 11% of the total forested land area of Europe (Metla 2012). The forests are primarily inhabited by Scots pine (*Pinus sylvestris*) and Norway spruce (*Picea abies*); these two species cover 67% and 22% of forested land, respectively (Metla 2012; Myllyntaus et al. 2002). The remaining 11% of forest is covered by broad-leaved trees. The two most common broadleaf species are silver birch (*Betula pendula*) and downy birch (*Betula pubescens*). Other broadleaves include species from the genera *Betula*, *Alnus*, *Populus*, *Sorbus*, *Prunus*, *Tilia*, *Acer*, *Quercus*, *Fraxinus*, *Ulmus*, *Malus*, *Rhamnus*, *Crataegus*, and *Salix*. The number of native plant species in Finland is much lower than similar boreal zones in North America; Finland houses only four native coniferous tree species and less than thirty native deciduous tree and shrub species (Metla 2012).

Historically, Finland has always had a very low human population. When the country declared independence in 1917 the human population was only 3.1 million. The population grew to 4 million in 1950 and 5 million in 1991 (Nieminen 2007). Today Finland still has a low

population; as of 2015 it was just below 5.5 million. Finland is the eighth largest country of landmass in Europe; however, it is only the 23rd most populated European country. Finland also has the fourth lowest population density in Europe; a lower national population density is only found in Norway, Russia, and Iceland (United Nation 2015). This low population density shows that much of the land is sparsely populated. According to the Finnish Ministry of Employment and the Economy, 70% of Finland's total population lives in urban areas covering only 6% of Finland's total area. The majority of Finland's total land area (70%) is sparsely populated with rural area housing a mere 6% of the country's total population. The remaining 24% of Finns live in rural areas close to urban areas or in rural heartland areas where the land is used by the forest industry (Helminen 2013).

Content

Historical Forest-use

Finland's climate and land do not support traditional agriculture. Long winters and summer frost, in addition to poor soil are limiting factors when raising crops. Simply put, traditional arable agriculture cannot produce successful harvest in the majority of Finland. When Finn's first settled the land the only way they could survive was to find an alternative way to produce food. They used a process referred to as slash-and-burn cultivation, burn-beat cultivation, or swidden. There were several specific techniques, but they all involved the common practice of felling and burning trees to grow crops in the fertile ash. The techniques varied depending on the species and age of tree stand burnt, the number of harvest produced, and the type of crop grown. The most common technique was *huuhhta*; a process that burned Norway spruce stands to cultivate rye.

Swidden is a primitive agriculture technique that historically was used in many forested parts of the world, not just Finland (Myllyntaus et al 2002; Tvengsberg 1995). The process varied across civilizations but they all used the same principles of burning a section of forest and then cultivating grain in the fertile ash. In Finland, before swidden developed early settlers would burn patches of the forest to attract large game such as Moose (*Alces alces*); the moose would come into the smoke to avoid insects. Later the people began to cultivate barley in the burned patches of forest (Alenius et al. 2012; Myllyntaus et al. 2002; Parviainen 1996). Between the 11th and 13th century there was a period known as the “Medieval Warm Period”. This relatively warm period, with little snow cover, allowed Finns to easily colonize much larger patches of land than before. Early colonizers began to develop a primitive form of swidden (Alenius et al. 2012). During the fifteenth century this form of slash-and-burn farming began to spread. It was then practiced in parts of Finland into the 20th century. In Europe, Finland was the only country that was still practicing swidden into the industrial period; because of this, it is characterized as a very “Finnish” type of cultivation (Kirby 2006).

Finland developed four different varieties of swidden based on the specific properties of the forest being used; *kaski*, *rieskamaa*, *huuhta*, and *Pykälikkömaa* (Myllyntaus et al. 2002; Soininen 1956). It was very important to choose the method most suitable to the forest being used so that the best harvest could be produced. Harvest failure could be catastrophic to the isolated Finns who had no major alternative food source.

The *kaski* method was practiced in deciduous forest or mixed forest dominated by broad-leaved trees. It was important that the stand be uniform in age between fifteen and thirty years old. In this method, trees were felled when the leaves were at the largest size, around mid-summer, to allow maximum evaporation to dry the felled trees. The felled trees would be left to

dry for a year until next summer where the dried dead trees would be burned. Autumn rye would be planted in the fertile ash from the burning, though occasionally barley would be planted in place of rye. For the following two years the field could be replanted with oats. If the field was extremely fertile, oats could be planted for up to five or six years. *Kaski* was extremely common throughout the history of swidden agriculture in Finland (Soininen 1956).

Another method was *rieskamaa*. This was a less-popular process used in younger deciduous forest, when the trees were too immature for *kaski*. In this process the half-grown trees were felled in the spring at first leaf; they were then burned that same summer. Barley and occasionally turnip were planted. After the first summer's grain would be harvested, the next season's oats, buckwheat, or turnips would be planted. Unlike *kaski*, a *rieskamma* field could only support two years of crops before the field was depleted of all nutrients. Additionally, this method only worked in areas where there was lots of sunshine to ensure that the felled trees were properly dried for the summer burn. Often dried, larger tree trunks would be brought from elsewhere to help burn all the smaller trees (Soininen 1956).

The most complicated and extensive method of slash-and-burn cultivation was *huuhta*. Unlike the two previous methods, *huuhta* was performed in coniferous or mixed forest. The first summer the largest trees were notched; rings were cut into the bark, which exposed the cambium. The purpose of this action was to allow the large trees, usually large pines, to dry; these trees were too big to be felled and were left standing during the burn (Soininen 1956). Pine, birch, and alder all worked for *huuhta* but spruce was the preferred species. Spruce has thinner bark than pine so it burns much easier; notched spruce trees also dry more quickly than the notched pine trees. Pine also generally grew in drier and less fertile soil (Myllyntaus et al. 2002; Soininen 1956). After the smaller trees were felled, they were left for

two years to dry. On the hottest period of the third summer, usually July, once the standing and felled trees were all dry, the land was burned. Rye was immediately planted among the burned debris and standing dead trees (Soininen 1956). The variety of rye used was different from rye planted in arable field cultivation; this variety was better adapted to survive the harsh winter climate (Solantie 1988).

A second complicated method of *huuhta* involved burning the land twice. In this version, the small trees were felled identical to the single-burn *huuhta*. In the second year the land was burned; at this time the ground was still moist so it was a very controlled burn. The *huuhta* was then left for another year so that the soil could absorb the nutrients from the first burn. During the third summer the land was burned for the second time, it was then planted with rye the same as in the single-burn *huuhta*. The rye would be harvested in the fourth year, this would be the only harvest generated from that *huuhta*. This twice-burned *huuhta* was difficult but it could produce huge harvests. Due to only one harvest being yielded from each *huuhta*, a farmer would have four separate *huuhtas* every year in the four different stages. Every summer the farmer would have one newly felled *huuhta*, a second *huuhta* either cleared or burned, a third *huuhta* that was burned and sown with rye, and a fourth *huuhta* ready to harvest (Soininen 1956).

The fourth and final method of slash-and-burn cultivation used in Finland was *Pykälikkömaa*. This method was distinct from the other three methods because it required changing a coniferous forest into a deciduous forest. It required a coniferous forest to be adjacent to a deciduous forest; in this way the farmer could inhibit the growth of the coniferous trees and allow the deciduous species to colonize the entire forest. The farmer would first individually notch all the coniferous trees. These trees would dry while the deciduous trees continued to grow and reproduce. Twenty years later the next generation of deciduous trees would then be cleared

and burn-beaten using the *kaski* method. This method was not very common; it was only used on dry pine stands in which *huuhtha* would not work. If there was access to other deciduous forest or spruce forests, then one of the other three methods would be used. The only place where this was the case was in northern Karelia; for that reason this is just a Karelian technique (Soininen 1956).

These four methods were not used simultaneously. They were separated both spatially and temporally. When Finland was first settled, the climate was more temperate; thus, the forests were almost all deciduous. *Kaski* was the first method to arise. After practicing *kaski* for several generations many of the prime forests had already been used. *Rieskamaa* was developed to use on the rejuvenated younger forests. As the climate began to cool again, the forest began to change to pine and spruce forests. At first, the Finnish people practiced *Pykälikkömaa* to change the forest back to deciduous forest. This was very time consuming and difficult; *huuhtha* was developed during the middle ages as a simpler alternative. Coniferous forest dominated Finland so *huuhtha* became the only practical type of swidden in the majority of Finland (Myllyntaus et al. 2002; Soininen 1956). Once an area was settled, *huuhtha* would often only be practiced by the first generation of human settlers. Slowly, the farmers would change the forest to a deciduous forest so they could perform *kaski* instead (Myllyntaus et al. 2002).

Kaski was preferred over *huuhtha* for many reasons. First, it took less time from start to finish. *Kaski* could also yield a wider variety of produce such as barley, oats, turnips, and buckwheat. These crops were more favorable to the rye yielded from *huuhtha*. Finally, one *kaski* could support at least two growing seasons, if not more, making it the most efficient slash-and-burn method.

Swidden is important to understand because it was the base of colonization in Finland. With this process of cultivation, the Finns could survive in the forest as long as they had access to forest, axes, fire, and seed. Slash-and-burn cultivation was most-extensively practiced in eastern Finland, where it was still practiced into the twentieth century (Bladh 2008; Kirby 2006; Tvengsberg 1995). Swidden expanded outside of eastern Finland in the 15th and 16th century. By the end of the 16th century there were permanent populations of burn-beat farmers in interior Finland, Sweden and Norway. The settlers or “Forest-Finns” would go into the land looking for areas with large, healthy spruce stands. Most farmsteads and towns began in the healthiest parts of the forest with the best spots for *huuhta* (Alenius et al. 2012; Bladh 2008; Tvengsberg 1995). Swidden could support huge amounts of people colonizing inner Finland in the 16th and 17th century (Kirby 2006; Soininen 1956). Once burn-beaters established permanent settlements, these forest populations could be expanded to villages or even whole cities. Due to these expansions, the total population of Finland began to drastically increase. In 1750, the population of Finland was 421,500 and by 1808 it had doubled to 874,800 (Myllyntaus et al. 2002).

Life revolved around the cycle of *huuhta*; in this way *huuhta* also shaped the culture and society. With *huuhta* the Finns had to migrate; they traveled great distances to find a patch of forest suitable for *huuhta*. A Swede in 1828 wrote that a Finn “without hesitation and long consideration might make journeys of forty, fifty, and sixty miles in the summertime by boat and wintertime upon his sled” (Tvengsberg 1995). He would return with experience and knowledge about practices and customs from that area. In the search for *huuhta*, the Finns would move and learn about that place where they stayed. They were not intimidated by long distances like many southern European static farmers; they were a well-traveled society.

Slash-and-burn cultivation also established a micro-economy among the locals. *Huuhta* was very difficult; one landowner had at least four separate *huuhtas* operating simultaneously. The landowner would employ workers to assist in his family's *huuhta*; the workers would in return get a share of the harvest. It required many people working together with perfect teamwork to have a successful harvest (Bladh 2008; Tvengsberg 1995). In eastern Finland, family names first appeared due to *huuhta* in the 12th and 13th century. The family names were needed to dictate separate slash-and-burn areas, as well as hunting grounds (Bladh 2008).

Slash-and-burn cultivation did have harmful effects on the old-growth forests, which cannot be denied. Today the majority of all forests are semi-natural having been used by humans in some way. By the end of the 20th century, 50 to 75% of the southern Finland's forests had been subject to slash-and-burn cultivation (Metla 2012). Although swidden reduced old-growth forests it actually had some positive effects on the environment. Firstly, after being burned and harvested, fields were allowed to naturally reforest, creating meadows and pastures. These opened areas broke up the coniferous monoculture of the boreal forests and allowed the number of deciduous and mixed forests to increase. The open areas also promoted diversity of flora and fauna (Myllyntaus et al. 2002). Additionally, the population of burn-beaters was low; so as long as the farmers allowed their fields to reforest, the forests could still prosper.

Swidden fell out of practice due to a combination of many factors. One huge problem was as swidden became more commonplace, it became harder to find acceptable forest. In 1760, 87% of Finland's population lived in the southern-boreal vegetation zone or on the border of the mid-boreal vegetation zone. Those practicing *huuhta* were forced to move north to the mid-boreal vegetation zone. This zone had untouched forests but there was a much higher chance of

crop failure from the harsh winters. Finland also had colder than average temperatures during the first half of the 19th century. This increased the likelihood of crop-failure. Harvest productivity then decreased substantially as farmers began to switch from *huuhta* to *kaski* (Myllyntaus et al. 2002). The government had also begun to issue legislation prohibiting or restricting the process. In the second half of the 19th century, an already hard practice became much more difficult and for this reason, many people began to seek alternate methods to feed themselves.

The main reason that burn-beat cultivation fell out of practice is because the industrial age brought better alternatives of accessing food and forest use. In the late 19th century, the price of timber rose; it became more profitable to use forested land for timber harvest rather than slash-and-burn cultivation. Additionally, modes of transportation efficiency had increased leading to easier movements of goods, such as food. Slash-and-burn was no longer the only way to get grain; people in remote, interior Finland could now purchase cheap grain from Russia. The price of butter and other bovine products also rose, so many Finns began to raise cattle; the exhausted fields from swidden made great pasture for raising cattle (Myllyntaus et al. 2002). Swidden was an answer to a problem of hunger; as technology advanced, there became easier ways to access food and it was no longer needed.

It is difficult to evaluate how harmful or successful burn-beat cultivation was. Before the industrial age, swidden was an economic necessity for the majority of poor, rural Finns. *Huuhta* for the Finnish people was like the California Gold Rush in North America. The Finns saw that they could get a crop with *huuhta* so they ventured north, even though it was dangerous and crop failure was common. They worked hard every year, rotating four different *huuhtas* at different stages. If they were lucky, they would be rewarded with a good harvest. If they were not lucky, their whole *huuhta* could be ruined by rain, frost, or snow.

This desire felt by the settler Finns was that distinctly human quality to venture into the unknown which allowed humans to spread to all corners of the earth. The burn-beaters knew they might fail but they still did it. By exploring the aspects and effects, one can see how much *huuhta* affected Finnish people as a culture. They were literally putting all their eggs in one basket when it came to food; using a small bit of the forests for themselves and hoping that the *huuhta* would not fail. As a burn-beater, your whole life revolved around the *huuhta*; so a deep connection to the forests was bound to arise. There was never enough food, but the Finnish people still survived. This connection to the forest as a valuable resource is still very strong in Finnish culture today.

Slash-and-burn agriculture was very important because it began the subsistence economy in Finland. As slash-and-burn cultivation fell out of popularity, it was replaced by other subsistence-based trades. The new practices that arose during the 18th and 19th century were dairy farming and the timber industry.

Dairy farming was familiar to the Finnish people. Their neighbors, the Swedes, had been practicing animal husbandry with cows for a long time. It happened that *huuhta* fields in fallow made fantastic pasture for cattle. In the late 19th century the Swedish Crown prohibited swidden. Many burn-beaters switched to animal husbandry as an alternative occupation. In the 20th century the domestic market for dairy was very popular. The majority of dairy farmers did not export their goods; they kept it local. Like burn-beat cultivation, the farmers did not produce an excess amount of product. They had enough to feed themselves and whatever was left over they sold locally. Dairy farming was a logical next step after burn-beat cultivation ended; it was a way to make an income and survive (Peltonen 1988).

Burn-beat cultivation was also outcompeted by the timber industry. Like the dairy industry, the majority of the timber industry was kept local and at a small-scale. During the seventeenth century, a time when *swidden* was still very popular, the forests were also being used to produce tar. Tar was Finland's main export during the mid-seventeenth century; this valuable resource helped expand Finland's global trade. In the eighteenth century the prices of tar fell and most forest owners switched to felling their forest for sawn timber (Kirby 2006). From the nineteenth century to today, the main product of the forest industry in Finland has been timber. In 1913, a time when *huuhhta* was only practiced in small regions of Eastern Finland, wood products including sawn timber, pulp, and paper accounted for $\frac{3}{4}$ of all Finnish exports (Kirby 2006).

That said, the main use of the forests was for domestic needs such as building materials and wood for heating. Only 30-35% of the timber felled was sold (Peltonen 1988). Most forest owners did not receive their income exclusively from their timber; in fact in the early 20th century only 36% of forest owners had excess timber which they could sell. Most forest owners did not have enough forest to even support themselves and often forest owners would have to buy additional wood to support their domestic needs (Peltonen 1988). Only a small percentage of forest owners had excess goods to export outside of Finland.

It is important to understand the hardships of the dairy and timber industry that the local farmer was met with in the 19th and 20th century. Like the burn-beat industry, these two occupations were not about exporting goods and making a profit. They were a way that the rural, often landless, people could earn a living and support their family. As with *swidden*, the timber industry created a community around the forest. The forest owners would employ seasonal workers to fell and transport the trees. It was a very large source of employment during

the early 20th century; every winter large numbers of men would move north to work in the forest felling the trees (Kirby 2006). The forests were not about abusing a resource to become rich, it was about utilizing a valuable resource to survive in a harsh, poor environment. This further established a deep connection between the Finnish people and their forest; it was their resourcefulness that allowed them to survive.

Modern Forest Use

The first half of this paper discussed how the Finnish people depended on the forest for survival. We can now see how this dependence invokes a sense of stewardship of the forests in the Finnish people today.

The forest industry has always been the main player in the Finnish economy. Into the 18th century burn-beat cultivation generated large harvests of rye. In the 19th and 20th century the timber market expanded the global trade of Finland. By 1912, wood products accounted for $\frac{3}{4}$ of the total Finnish Exports (Kirby 2006). Today the Finnish forest industry is a very significant member of the world's global forest industry contributing wood products such as paper, pulp, and board production (Koskela 2014). According to the Natural Resources Institute Finland (2012), "Relative to its size, Finland is more dependent on forests and the forest industry than any other country in the world". The forests have been so extensively used that today there are almost no untouched forest in Finland (Metla 2012).

There have been many surveys performed by various associations in Finland to see what the peoples' opinions and values are concerning the forest. A slightly older survey commissioned by the Finnish Forestry Association in 1993 evaluated the Finnish people's attitudes about the forest based on six factors: forest ownership, role of forestry and forest industry in the national economy, forest industry, forest management, environment, and trust-

worthiness of various information systems. This single survey found that all respondents were unanimous in considering Finland's forest industry to be the largest source in the nation's well being; they all understood that their country was dependent on the forests. Although the common person may not know many details about the forest industry, they understood the importance of the industry. Understandably, based on the value of the forest industry, the majority of the respondents from this particular study wished to see more government money used toward environmental protection (Kangas & Niemeläinen 1996).

A similar study was put out in 1996 by the Finnish Forest Research Institute. The purpose of this study was to address the recipient's relationship with forest nature, forest management, and forest utilization. This survey was composed of Finnish and Swedish-speaking Finnish people aged 15-75 years old with a total response percentage of 67%. Of the respondents, only 20% were in nature-related professions such as agriculture, forestry, and fishing (Kangas & Niemeläinen 1996). The response percentage alone tells a lot about society's opinions regarding the forest. Firstly, the response rate is actually fairly high for a large, mailed survey. Secondly, the response rate for Swedish-speaking recipients was slightly lower than for Finnish-speaking recipients; this makes sense because the forest industry has always been much more significant in central and eastern Finland. The western, Swedish-speaking region of Finland could support small amounts of arable agriculture and dairy farming; thus it is expected that the individual's value of the forest would be lower in that region of Finland.

The study performed by the Finnish Forest Research Institute was much more extensive in showing the modern, urban person's connection with the forest, compared to the earlier study by the Finnish Forestry Association. Firstly, the survey found that the majority of Finnish People enjoy utilizing the forest for outdoor activity. Almost all respondents (92%) indicated that

they spend some time outdoors. The most popular outdoor activity is collecting wild berries and mushrooms; 87% of all respondents marked they do this sometimes or often. Aside from using the forest for recreation, the same study found that the majority of respondents support the conservation of Finnish forests. Seventy-four percent of the respondents agreed that a larger proportion of Finland's current taxes should be allocated to maintaining forest biodiversity. Some people, specifically the young people, were even willing to pay more taxes to help maintain biodiversity. Half of the respondents agreed that the area of forested land under conservation should be increased. Conservation was valued by the respondents; however, 50% of the respondents were also okay with clear-felling forested areas for resources. The concluding opinion was that only 16% of the respondents thought the forest industry was doing a sufficient job at maintaining the state of the environment; the majority of respondents felt that there needed to be some sort of change to maintain forest vitality and health, beauty of the landscape, biodiversity, and other factors of the forest (Kangas & Niemeläinen 1996).

This survey only documented the opinion of a small percentage of the Finnish population; however it is extremely important in showing the trends of society's opinion of the forests. Firstly, the survey shows that the people of Finland as a whole have a personal, active opinion about their forest. Over $\frac{2}{3}$ of the recipients of the survey took the time out of their day to fill out this survey. It was fairly long and they received nothing from filling it out. This factor cannot be ignored; it shows that for $\frac{2}{3}$ of random recipients of the survey, their opinion was strong enough that they filled it out.

The survey also shows that the personal, active opinion about the forest use, management, and industry is not unanimous. Like many issues, the opinion of forest use is a gradient with a left and a right view; this opinion is mostly based on socio-economic status. The

first group is the rural group; it contains the forest owners and the older individuals. The second group contains the urban individuals; the more educated and younger non-forest owners. Both groups agree that the forests are extremely important to Finland's economy. The mixed opinions are based on how to maintain the forest. The forest owners believe that all the forest should be used within the forest sector; the forest should all be felled based on sustainable principles. The non-forest owners believe that some of the forest should be set aside for biodiversity conservation and that clear-felling should be completely prohibited in these areas. The trend is very straightforward; the higher the socio-economic class, or the higher the level of academic achievement, the more in favor one is of setting aside additional land to aid in biodiversity and land conservation, even if that means paying more taxes. Tyrväinen (2003) found a similar result in his study comparing the ecological and aesthetic values in urban forest management. This study found that more-educated respondents prefer less-managed forests which have a larger ecological role in the environment. This is based on their familiarity with conservation issues (Tyrväinen 2003). Regardless of whether they wanted the forests to be used in industry or conservation, almost all Finns see the forest as a valuable resource; it needs to be managed so that it can continue to be used as a resource.

The survey did find several flaws with forest management. The first flaw concerns forest owners. Forest owners have a huge priority for the maintenance of biodiversity in their forest stands, but they do not feel the need to set aside forest for conservation. To them forests where wood harvest is prohibited is a waste of resource and could be a huge loss of income to the small, local forest owner. Another issue with forest conservation in Finland is that the people who support forest conservation - the urban, young, and highly educated - are removed from the areas where forest conservation would actually happen. They live in big cities, the majority of which

are in the south; the areas where forest conservation needs to happen is not limited to the south, and it stretches across all of Finland, specifically into central, eastern, and northern Finland.

This survey brought up many questions that are all very hypothetical. They are issues that to an outside reader may seem hard to conceptualize, because they do not have the direct connection to the forest. This is why I am writing this paper with my personal commentary. I am both an outsider and an insider. During my time in Joensuu, Finland I got the chance to become directly involved with the forests of Finland. I directly saw how they were used in day-to-day life. It is now important to tie together what life is really like for the Finnish person living in a location where forestry is valued.

Joensuu is a town of 57,000 inhabitants in North Karelia, eastern Finland. The town is completely surrounded by forest. Within the town, green areas represent 34% of the land area, mostly in forested parks. The dominant species of these parks are Scots pine aged 60-70 years old (Tyrväinen 2001). Traditionally Scots pine is favored for urban forests, rather than spruce stands (Tyrväinen 2003). Joensuu has many wooded recreation areas with skiing, jogging, and biking trails. Unlike people living in huge urban cities such as Helsinki or Tampere, residents of Joensuu cannot help but feel a connection to the forest. Most people cannot drive or bike to work without passing through some forested area, even if it is small. Additionally, Joensuu is in Karelia, the area where *huuhta* was most common.

My experience in Joensuu revealed how much the residents cared about their local forests. A survey performed in Joensuu found that all respondents had a positive attitude towards urban forestry. The majority of residents of Joensuu felt that urban forest caused no negative effects on the town; the forests had many benefits related to nature, as well as social values like outdoor activities and exercise. Almost $\frac{3}{4}$ of the Joensuu respondents said they use the forests at

least once a week; $\frac{1}{3}$ of the residents used urban forests 2-3 times per week. Additionally, compared to a lower percentage received by Kangas and Niemeläinen (1996), this survey in Joensuu found that over 50% of respondents would be willing to pay a tax to prevent the reduction of forested parks in housing areas (Tyrväinen 2001). Not only did Joensuu residents take an active interest in their forest by filling out this survey (it had a 68% response rate), but public consultation is also part of the planning process for urban forest management in Joensuu (Tyrväinen 2001).

It is not surprising that the citizens of Joensuu have a connection with their forests; Joensuu is considered the Forestry Capital of Europe. Joensuu houses the headquarters of the European Forest Institute. The Finnish Forest Research Institute (METLA) also has a unit in Joensuu which has been active since 1981. This unit employs over 80 researchers to promote and to develop regional economic and enterprise activities based on forest and forestry products in eastern Finland. The Metla House in Joensuu is the first large wooden office building in Finland (Metla 2014). The Joensuu Science Park and the various universities are also all very involved with the forest industry. The Joensuu Arena is the largest wooden building in Finland. This huge multipurpose hall, commissioned by the City of Joensuu, was completed in 2004 (Raiski 2006).

Joensuu is an example of a town where forests are valued not just as a resource for the forest industry; they also have aesthetic, recreational, and biological values. Joensuu is also unique from more southern urban areas because individuals supporting conservation in Joensuu directly live in the areas where forestry is chiefly practiced. There is no distance barrier between the supporters of conservation and the forest owners. Both parties live in the same region. It is the job of all the forest agencies in Finland to educate the public about the value of the

forests. In this way the forests will be seen by the public and forest owners not just as a resource for the economy but as a natural resource that needs to be conserved in a natural state.

Conclusion

The people of Finland feel a sense of stewardship for their forests. It has been the central resource to the colonization and growth of their country for much of Finland's history. Today it is seen as a resource which can be enjoyed by everyone. Because of this deep connection with the forest, forest conservation in Finland is a story of success. According to the Natural Resources Institute Finland the state of Finland's forests have improved over the past twenty years. As of 2012, the total area of protected forest in Finland is 9.6% of all forested land. The percentage of strictly protected forests in Finland is 5.2% of all forested land, which makes it the highest in Europe. Since the 1970's, the Finnish government has adopted seven different programs that work towards the conservation of habitat, including forests. Today there are 37 national parks in Finland. Additionally there are 19 nature reserves and 12 wilderness areas. All of these areas prohibit felling or severely restrict it (Metla 2012). During the 20th century, several new forest acts were passed by the Finnish Government to protect the forests. These efforts include the Act on Protective Forests of 1922, the Act on Prevention of Forest Fungi and Insect Damage of 1991, and the Forest Act of 1997. The combined efforts of these acts have helped prevent the northern timberline from receding south, prevented widespread forest damage, and protected biological diversity in commercial forest (Metla 2012).

Forest-use in Finland is very important to understand because it shows the multi-use system that all forests should possess. In Finland the people have always depended on the forest; they feel that the forest is their resource and that they have a right to it. This is based on centuries of using the forest to their advantage, to make a civilization. This deep connection with the

forests encourages the public to support both the forest industry and forest conservation; the people's opinion about forest management is not unanimous but the majority of people still have an active opinion.

As we move further into our technological age, our idea of conservation must change. Some people who say they support resource conservation are greatly opposed to any practice which could be harmful to that resource. The truth of the matter is that conservation is not just about saving the resource. To be a true conservationist one must be willing to look at all sides of an issue and find the middle ground which can benefit the most parties. In this way, conservation is a multi-disciplinary field; conservationists must work with governments, industries, scientists, and the public to find a way to both utilize a resource and conserve it at the same time. Finland is one country which has the opportunity to perfectly achieve this modern view of conservation. The forest industry utilizes the forest to boost the economy. The government has many different forms of legislature to protect and conserve Finland's forests. Many different forestry industries such as the European Forest Institute and the Natural Resources Institute Finland study the forest to learn how to better protect them. Finally, the public takes an active interest in using the forest for recreational activities; they also have an active opinion about how the forests should be managed. All these different disciplines and opinions create a constant demand for healthy forests in Finland while keeping a constant discussion of how to improve the state of Finland's forests. As members of our earth we have a responsibility to use our resources sustainably to conserve them for future generations; it is Finland's job to control forest use so that all activities are sustainable and support the growth and maturation of forests. As long as this nation continues to keep an active, sustainable interest in the forest, they will continue to be a world leader in both forestry and forest conservation.

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